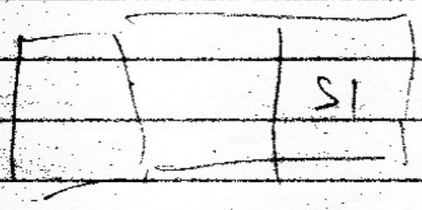
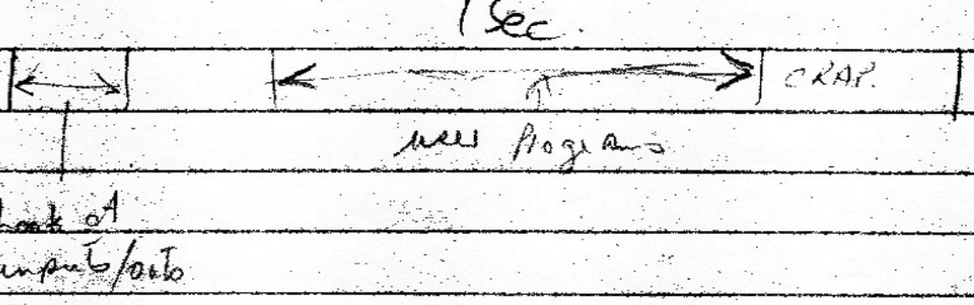
Handwritten summary of Foxboro Programming Language (FPL) main features written circa 1975

Din 48 inputs Panel
Dout 48 output Panel Implemented





Read Foxe 2-10 Mar guide

Operations

>	A > B	
<	A < B	
=	A = B	Computing expression A = A+1 LHS take value of RHS
+	A + B	
-	A - B	
*	A * B	
/	A / B	
SQR	SQR(A)	
ABS	ABS(A)	
&	A & B	Logical AND
$	A $ B	" EXCLUSIVE OR
!	A ! B	" OR
NOT	NOT(A)	" NOT Negation
BIT	BIT(A, B)	Bit Test Let: BIT (14, Fred) = 1

Delimiters

( )

> >= < <> = + - * / ; : Print out A, B, C. - Separator of Variable Names.

!! Used in Read + Print Statements

End of Statement

End of Program

Break between Command and operator LET : C = A + B ;

Error reporting Syntax - SYN

Attribute - ATTR

Constants

Integer - No decimal point

Real Has " "

Comparing input for Real which is real - must be compared to a real constant.

If (B < 35) GOTO B must be integer

Variables

A, B etc ← Integer or real

Mixed mode Arithmetic Integer + real mixed

I/I → Real Answer.

Max N° in Real 32767

40000 in Real Comes out 4000E1 Limit E39

Small N° 0.0004 4E-4

I ± R → R I × R → R

I/R → I R/I → R

SQR (- R or I) → SQR (ABS (- R or I) → R

Relational Expressions.

IF (RELATIONAL EXP.) GOTO: LABLE ;

WAITUNTIL (REL EXP);

WAITUNTIL (Rel Exp) OR: DELAY; ← Time in Seconds.

Examples - IF (A!B!C!D >35) GOTO this is Wrong

IF ((A>35)!(B>35)!etc) GOTO OK

WAITUNTIL (LEVEL = 100) Do not use

use WAITUNTIL (LEVEL > 100)

Comparisons must be Real or Integer only.

SYSTEM COMMANDS (Editor) - Not used in Hoglang. (used on SystemTaurus)

DEF: TASK: name (P); ← P: Priority Number 1–15 (Alphabetic Character)

Highest, lowest.

on 1 level Priority is in order of entry

Put o/p - i/p on lowest level.

/; finished defining Do not operate TTY. on two diff. levels. otherwise two Printouts will mix.

DEF: SUBR; name;

SEL: name. Moves pointer to routine name. Sel, 5 goes to line 5 of Name.

SEL: name, number

ADD;

DEL;

LIST; Lists from where Pointer points.

TYPE: name ← Variable, Types the value of. (Variable only?)

CHG: name, value.

RUN: name. ← insert as output of task.

STOP: name

DSYMB;

PRTSYM; List all defined Variables, Tasks etc (User defined Symbols in Reverse order of entry)

CORE; Prints no of decimal Words left

CNTRL/U. Rubs out whole line when inputting RUBOUT chacter at a time

TASK STATEMENTS. Between DEF & /;

ARRAY: name (No) ; number of values to be stored in array.

LET: name = Expn; Assign the value.

IF

WAITUNTIL

GOTO: Lable;

PRINT (DEV) "Text" name, ; Variable DEV # 1 - S.T. #3 - LOGGER. # 2 - CRT. max 120 chars in Print

WAIT: Delay; Seconds or Compare against Clock.

ACT: name; Same as RUN in Syst Command Mode.

DEACT: name; Same as STOP in Syst. Command mode

GOSUB: name; End of SUBroutine with a dummy statement.

STRING: name (no); Number of chars in String. then LET: Name = "Text (max 156 chars)

GOTO (X, Y, Z, etc) VAR; Val = 1, 2, 3 etc as set then GOTO line # by X, Y, Z etc. then PRINT (RUN) Name.

READ (DEV) name; Always preceed by Int statement asking for entry of data etc.

Out System.

Level — Note All Analog i/p & Digital O is already running

1 Empty

2 Empty

3 SYSSEC — momentary contact every second

4 RNSCN — Activates every 4 secs FIREPRO & 2 every 2 secs. Flow Computation Programs.

5 FIREPRO.

6 TCOC — Detection program.

7 DISTR, INTA (sec), ACU1 (min), ACU2 (HOUR) — totaling of flows
Reads & Tests Pulse meter flow meas.

8 LOG 9 — Power failure resets day to what it was 1 sec before power fail and prints power fail message clock will be wrong by length of Power Failure.

9 Log 13 — Checks Log fire flag. Display etc.
Checks state of values on Fire Condx.

10 LOG 18 (24 Hr Log), LOG 19 — HOUR = 7 then ACT LOG 18 & wait until LOG 18 is finished then zeros the array used by Log 18.

11 PIC 11 (FIRE COND. MESSG), LOG 1A (SUSPECT T/C.), LOG 1 (CRT ON DEMAND LIST OF O/C T/C.), LOG 14 (Compressors off eco log.)

12 PIC 1 (Plant Display), FLASH (Flashes Values on Plant Display), PIC 2 (org chart display on CRT), PIC 12 (Puts Values on CRT & Updates every 5 Secs.)

13 LOG 10 (List of T/C on Demand), LOG 11 (List of Fire Condx Messg etc 3 mins.), LOG 16 (Comms? is now normal. <177 (after Temp <179.99°)), LOG 17 (All comp normal.)

14 14 Programs all pictures on CRT.
Note if Fire AIO is NOT running then Temp shown against display do not update but values down the side do

15 LIBR (Housekeeping Defines Arrays 1 Time run.), CLOG (Reads CRT Permanent Read. Do everything else after it is blocked out), STARTUP (Activates DOOM Runs LIBR DTA. AI's Puts all Compressors on Scan.)

Restart — STOP: CLOG
START: STARTUP.

I/O Definitions.

```
DEF: AIN: A1(95)                    Allocates Space for 95 Analog inputs
PER: 1;                             Rate of Looking.
CHAN: 0, 0, 1;                      RTB is connected to Point 0 of 1st Card
CONV: IC;                           in 1st Rack Called AMB.
IRG: -50.0, 50.0;
ERG: 0.0, 430.0: DEGC
OCD: Ø                              ← Must be set to Ø. OCD off - Ref to
/;                                  relay switching cards. However our cards
                                    have OCD implemented permanently.
```

```
DEF: DOUT: COUT;                    ← By default assumes 1.
CHAN: 1;
/;
```

```
DEF: DOUTM: SECU                    Momentary contact. (Security Contact)
CHAN: 2;
/;
```

```
DEF: DIN: CIN(2);
ATR: 1;
CHAN: 1;
```

How would you stop all Analog inputs from scanning?

Method 1

```
DEF: TASK: FRED(5);
LET: A = 1;
1: PRINT(1)"STOP: AI("A");CR LF;
";
LET: A = A+1;
IF(A ≤ 9)GOTO: 1;
DEACT: FRED;
/;
```

```
DEF: TASK: FRED(5)
LET: A=1;
1: DEACT: AI(A);
LET: A=A+1
IF (A<96) GOTO: 1;
DEACT: FRED;
Type RUN: FRED;        Zot to be done.
```

Write TASK TO test. Dig. outs.
DIM
using Short on DIM
multimeter on DOUT.

Shorted DIM = 1.

```
DEF: TASK: FRED(5).
1 LET: A=9;
LET: B=Ø;
LET: COUT(A)=BIT(B,CIN(1))
```

```
DEF: TASK: FRED(5);
LET: CHECK=Ø;          (bit 0-15)
LET: CHICK=Ø;          (Word 1 of 2)
1: WAIT UNTIL (BIT(CHECK,CIN(CHICK))=1) OR :60;
IF (BIT(CHECK,CIN(CHICK))=Ø) GOTO: 33;
PRINT(1): "DIM Δ CIN("CHICK")Δ BIT Δ "CHECK",
        Δ OK CRLF,
;
3 LET: CHECK=CHECK+1
IF (CHECK<16) GOTO: 1;
LET: CHICK=CHICK+1
LET: CHECK=Ø;
IF (CHICK<3) GOTO: 1;
GOTO: 4;
33: PRINT(1)."DIM Δ CIN("CHICK")Δ BIT Δ"
```

Program to Calc. Area of Triangle obtain via TTY.
Base & Height. and type out Base, Height Area

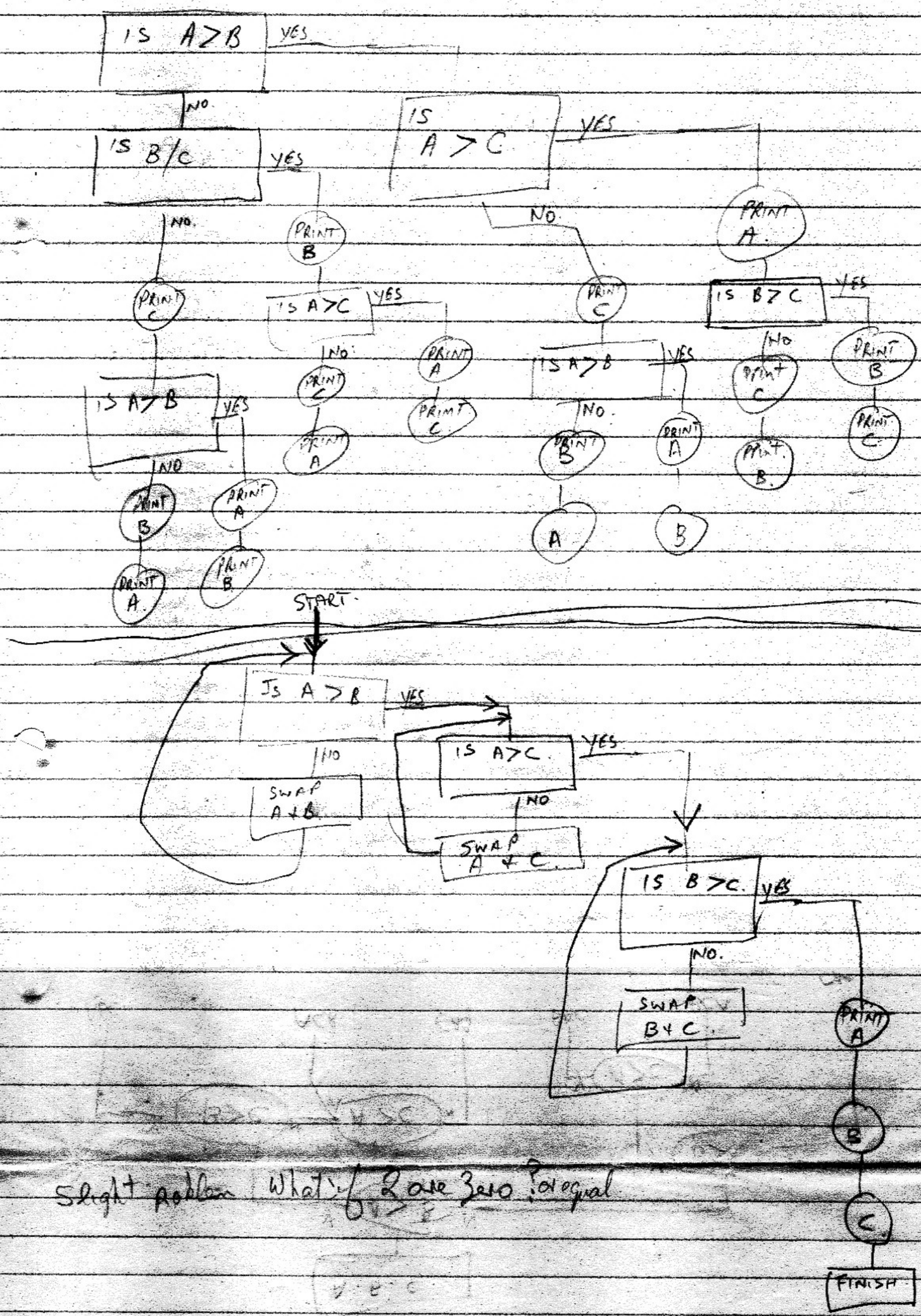
```
DEF: TASK: FRED (5);
PRINT(1): "WHAT IS BASE DIMENSION";
READ (1) Base;
PRINT(1): "WHAT IS HEIGHT DIMENSION";
READ(1) HEIGHT;
LET: AREA = BASE * HEIGHT / 2.0;
PRINT(1): "AREA OF TRIANGLE WHOSE BASE IS=" BASE " AND HEIGHT IS=" HEIGHT;
PRINT(1): "IS=" AREA;
DEACT: FRED;
/;
```

```
DEF: TASK: FRED (5);
1: PRINT(1): 'WHAT IS BASE DIMENSION?";
READ (1) BASE;
IF (BASE < Ø) GOTO: 1;
2: PRINT (1). "WHAT IS HEIGHT DIMENSION?";
READ(1) HEIGHT;
IF (HEIGHT < Ø). GOTO: 2;
LET: AREA = HEIGHT * BASE / 2.0;
etc
```

Format is wrong so must put CRLF into Print Statements.

NOTE READ statements are terminated after data entry by ; Semicolon. ONLY

Do flowchart to solve the problem of printing out 3 numbers in decreasing order of value.



Slight problem: What if $a \geq 0$ are zero? or equal